



Latest trends for condition assessment using non-destructive techniques

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Abstract

Bridges are one of the most vulnerable assets within the transportation network. Ageing processes in combination with changing loading conditions make these assets especially vulnerable to structural damage and material degradation. To ensure the optimal operation, appropriate maintenance practices are required, and new techniques and methods facilitating a more accurate diagnostic and safety assessment are being demanded.

IM-SAFE project aims to fill the gaps in the existing European standards regarding monitoring, maintenance, and safety of transport infrastructure. This paper gathers information about surveying technologies with a focus on optical and radar remote sensing technologies. The final purpose of this article is to support the use of these technologies in the management of bridges and tunnels, and demonstrate the value of their information for the safety assessment of in-service structures.

Keywords: Non-destructive testing, remote sensing, satellite, UAV, LiDAR, GPR, condition assessment.

1 Introduction

In recent years, the modern society has faced a rapid growth of testing, inspection, and monitoring technologies in various sectors. In the domain of transport infrastructure, intensive research has been carried out to enable the use of non-destructive data collection technologies to support asset management of bridges and tunnels.

These technologies allow realise condition survey and are therefore referred to as surveying technologies. Condition survey is the process of acquiring data and transforming it into information about the current condition of the structure with regard to its appearance, functionality and/or ability to meet the specified performance requirements [1].

The aim of condition survey is to recognise important limitations, defects, deterioration of the structures and the needed measures accordingly. During condition survey, data may be obtained by activities such as inspection, monitoring and testing through a wide range of data collection technologies.

However, accepted and harmonised approaches to condition survey are lacking to this day. This hinders asset owners and public authorities in charge of maintenance of the transport infrastructure to apply the latest developments.

This paper aims to respond to this challenge by reviewing data collection technologies used for condition survey and identifying their requirements, focusing on those technologies applicable to bridges and tunnels. The document is